ENT 25755:2022 PG 1 of 43
ANDREA ALLEN
UTAH COUNTY RECORDER
2022 Feb 28 2:13 pm FEE 0.00 BY TM
RECORDED FOR AMERICAN FORK CITY

When Recorded Mail To:
American Fork City
51 East Main
American Fork UT 84003

NOTICE OF INTEREST, BUILDING REQUIREMENTS, AND ESTABLISHMENT OF RESTRICTIVE COVENANTS

This Notice is recorded to bind the attached Geotechnical Study dated Oct 20 2020 along with the site grading plan to the property generally located at 781 East Quality Drive (address), American Fork, UT 84003 and therefore mandating that all construction be in compliance with said Geotechnical Study and site grading plan per the requirements of American Fork City ordinances and standards and specification including specifically Ordinance 07-10-47, Section 6-5, Restrictive Covenant Required and 6-2-4, Liquefiable Soils. Said Sections require establishment of a restrictive covenant and notice to property owners of liquefiable soils or other unique soil conditions and construction methods associated with the property.

Exhibit A – Legal Description of Property
Exhibit B – Geotechnical Study
Exhibit C – Site Grading Plan

Dated this 19 day of November, 2021.

OWNER(S):

(Signature)	(Signature)
Nathan V. Pugsley (Printed Name)	(Printed Name)
Manager, Walton Lane Townhomes QOZB, LLC (Title)	(Title)

STATE OF UTAH)
§
COUNTY OF Utah)

On the 19 day of November, 2021, personally appeared before me Nathan W. Pugsley, Manager and Walton Lane Townhomes QOZB, LLC Owner(s) of said Property, as (individuals and/or authorized representatives of a company), and acknowledged to me that such individuals or company executed the within instrument freely of their own volition and pursuant to the articles of organization where applicable.

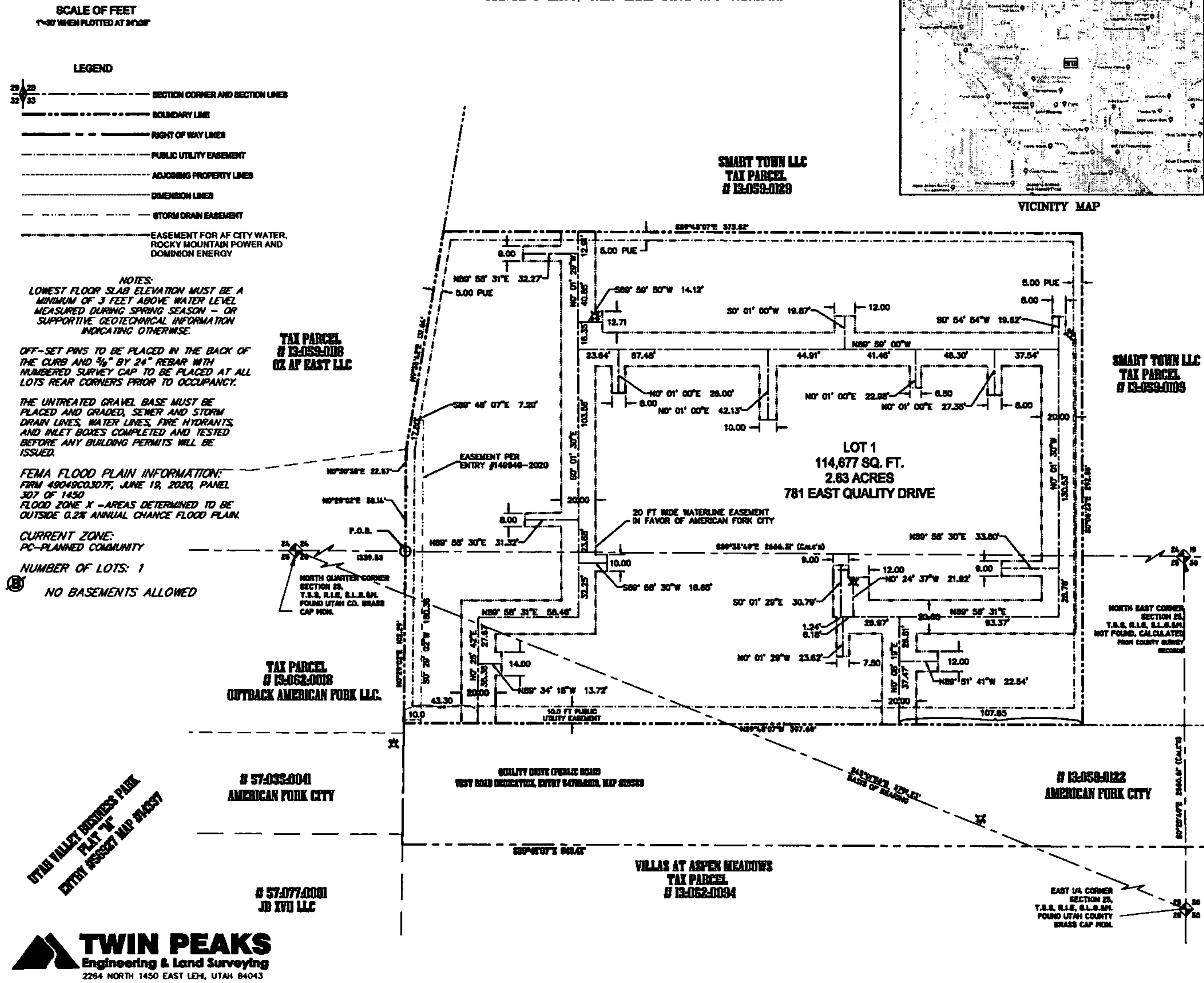
NOTARY PUBLIC
JARED MCCARTY
701507
COMMISSION EXPIRES
JULY 31, 2022
STATE OF UTAH

Notary Public
My Commission Expires: July 31, 2022

Exhibit 'A'

WALTON TOWN HOMES SUBDIVISION

LYING AND SITUATE IN THE SOUTHEAST QUARTER OF SECTION 24 AND NORTHEAST QUARTER OF SECTION 25, TOWNSHIP 5 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN



SURVEYORS CERTIFICATE

I, S. Scott Carlson, certify that I am a Professional Land Surveyor holding license number 187727 accordance with Title 58, Chapter 22, Professional Engineers and Professional Land Surveyors Licensing Act and that a survey of the described tract of land has been completed in accordance with Section 17-23-17 and that I have verified all measurements, have placed monuments as shown hereon.

DESCRIPTION

A PARCEL OF LAND LYING AND SITUATE IN THE NORTHEAST QUARTER OF SECTION 25 AND THE SOUTHEAST QUARTER OF SECTION 24, TOWNSHIP 5 SOUTH, RANGE 1 EAST, SALT LAKE AND MERIDIAN. COMPRISING 2.63 ACRES PER WARRANTY DEED RECORDED AS ENTRY 184738:2020 IN THE OFFICE OF THE UTAH COUNTY RECORDER. BASIS OF BEARING FOR SUBJECT DESCRIPTION BEING SOUTH 45°01'59" EAST 3791.23 FEET MEASURED BETWEEN THE UTAH COUNTY SURVEY BRASS CAP MONUMENTS MARKING THE NORTH QUARTER CORNER AND THE EAST QUARTER CORNER OF SAID SECTION 25. SUBJECT PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTH QUARTER CORNER OF SAID SECTION 25, THENCE SOUTH 89°35'49" EAST 1339.53 FEET TO A POINT ON A SURVEYED BOUNDARY (SURVEYING ASSOCIATES, FILE #81-65 AT THE UTAH COUNTY SURVEYOR'S OFFICE) AND THE TRUE POINT OF BEGINNING.

THENCE ALONG SAID SURVEY BOUNDARY LINE THE FOLLOWING 2 COURSES: 1) NORTH 00° 29' 02" EAST 38.14 FEET, 2) NORTH 00° 30' 38" EAST 22.57 FEET; THENCE NORTH 09° 39' 42" EAST 131.64 FEET; THENCE SOUTH 89° 48' 07" EAST 373.82 FEET; THENCE SOUTH 00° 08' 23" EAST 282.49 FEET TO A POINT ON THE NORTH RIGHT OF WAY LINE OF QUALITY DRIVE (PER WEST ROAD DEDICATION PLAT, ENTRY 64718:2018 UTAH COUNTY RECORDER); THENCE COINCIDENT WITH SAID R.O.W. NORTH 89° 48' 07" WEST 367.69 FEET TO SAID SURVEYED BOUNDARY LINE; THENCE COINCIDENT WITH SAID SURVEYED BOUNDARY LINE NORTH 00° 29' 02" EAST 102.29 FEET TO THE POINT OF BEGINNING.

CONTAINING 2.63 ACRES 114,677 SQ. FT.

OWNER'S DEDICATION

Known by all men present that We, all of the undersigned owner's of the property depicted and described hereon, have caused the same to be subdivided into Lots, Streets and Easements and do hereby dedicate said Public Areas as indicated hereon for perpetual use of the Public.

In witness hereof we have hereunto set our hand(s) this ______ day of __________, ______

BY:
Title:

CORPORATE ACKNOWLEDGEMENT

STATE OF UTAH } S.S.
COUNTY OF

On the ______ day of __________, ______ personally appeared before me, the undersigned Notary, in and for said County of __________, in said State of Utah, the signer of the above Owner's Dedication who after being duly sworn, acknowledged to me that he/she signed it freely and voluntarily for and in behalf of said Corporation the purposes therein mentioned.

Commission Number

Notary Public   My Commission Expires

APPROVAL BY LEGISLATIVE BODY

The City of American Fork, County of Utah, State of Utah, approves this subdivision and hereby accepts the dedication of all Streets, Easements, and other parcels of land intended for Public Purposes for the perpetual use of the public this ______ day of __________ A.D.

MAYOR

CITY COUNCIL MEMBER   CITY COUNCIL MEMBER

CITY COUNCIL MEMBER   CITY COUNCIL MEMBER

CITY COUNCIL MEMBER

CITY ENGINEER   ATTEST: CLERK – RECORDER

APPROVAL BY LEGISLATIVE BODY

Approved this ______ day of __________ A.D. ______, by the American Fork City Planning Commission.

Planner   Planning Commission Chair

WATER AND SEWER AUTHORITY APPROVAL

Approved this ______ day of __________ A.D. ______, by the Water and Sewer Authority.

Public Works Director

WALTON TOWN HOMES SUBDIVISION

LYING AND SITUATE IN THE SOUTHEAST QUARTER OF SECTION 24 AND NORTHEAST QUARTER OF SECTION 25, TOWNSHIP 5 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN

AMERICAN FORK CITY, UTAH COUNTY, UTAH

Surveyor   Clerk – Recorder

No. 187727 S. SCOTT CARLSON STATE OF UTAH

DESCRIPTION

A PARCEL OF LAND LYING AND SITUATE IN THE NORTHEAST QUARTER OF SECTION 25 AND THE SOUTHEAST QUARTER OF SECTION 24, TOWNSHIP 5 SOUTH, RANGE 1 EAST, SALT LAKE AND MERIDIAN. COMPRISING 2.63 ACRES PER WARRANTY DEED RECORDED AS ENTRY 164739:2020 IN THE OFFICE OF THE UTAH COUNTY RECORDER. BASIS OF BEARING FOR SUBJECT DESCRIPTION BEING SOUTH 45°01'56" EAST 3791.23 FEET MEASURED BETWEEN THE UTAH COUNTY SURVEY BRASS CAP MONUMENTS MARKING THE NORTH QUARTER CORNER AND THE EAST QUARTER CORNER OF SAID SECTION 25. SUBJECT PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

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CONTAINING 2.63 ACRES 114,677 SQ. FT.

1497 West 40 South
Lindon, Utah - 84042
Phone (801) 225-5711

840 West 1700 South #10
Salt Lake City, Utah - 84104
Phone (801) 787-9138

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

Exhibit 'B'

Geotechnical Study
American Fork Property
650 South 700 East
American Fork, Utah

Project No. 208741

October 12, 2020

Prepared For:

Brighton Homes Utah
Attention: Mr. Shawn Poor
45 East Center Street #103
North Salt Lake, UT 84054

CERTIFICATE

I hereby certify that I am a licensed professional engineer, as defined in the "Sensitive Lands Ordinance" Section of American Fork City Ordinances. I have examined this report to which this certificate is attached and the information and conclusions contained therein are, without any reasonable reservation not stated therein, accurate and complete. Procedures and tests used in this report meet minimum applicable professional standards.

PROFESSIONAL ENGINEER
No. 5567049-2202
TIMOTHY ALLAN MITCHELL
Electronically generated on
10/12/2020
STATE OF UTAH

Timothy A. Mitchell, P.E.
Senior Geotechnical Engineer

TABLE OF CONTENTS

ATTACHED FIGURES

APPENDIX A

1.0 SUMMARY

This entire report presents the results of Earthtec Engineering's completed geotechnical study for the American Fork Property in American Fork, Utah. This summary provides a general synopsis of our recommendations and findings. Details of our findings, conclusions, and recommendations are provided within the body of this report.

- The native clay soils have a slight potential for collapse (settlement) and a slight to moderate potential for compression under increased moisture contents and anticipated load conditions. (see Section 6)
- Conventional strip and spread footings may be used to support the structures, with foundations placed entirely on a minimum of 18 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils for structural loads up to 5,000 pounds per linear foot for bearing walls and up to 50,000 pounds for column loads. If loads exceed these see Section 10 for further recommendations.

Based on the results of our field exploration, laboratory testing, and engineering analyses, it is our opinion that the subject site may be suitable for the proposed development, provided the recommendations presented in this report are followed and implemented during design and construction.

Failure to consult with Earthtec Engineering (Earthtec) regarding any changes made during design and/or construction of the project from those discussed herein relieves Earthtec from any liability arising from changed conditions at the site. We also strongly recommend that Earthtec observes the building excavations to verify the adequacy of our recommendations presented herein, and that Earthtec performs materials testing and special inspections for this project to provide continuity during construction.

2.0 INTRODUCTION

The project is located at approximately 650 South 700 East in American Fork, Utah. The general location of the site is shown on Figure No. 1, *Vicinity Map* and Figure No. 2, *Aerial Photograph Showing Location of Borings*, at the end of this report. The purposes of this study are to evaluate the subsurface soil conditions at the site, assess the engineering characteristics of the subsurface soils, and provide geotechnical recommendations for general site grading and the design and construction of foundations, concrete floor slabs, miscellaneous concrete flatwork.

The scope of work completed for this study included field reconnaissance, subsurface exploration, field and laboratory soil testing, geotechnical engineering analysis, and the preparation of this report.

3.0 PROPOSED CONSTRUCTION

We understand that the proposed project, as described to us by Mr. Shawn Poor with Brighton Homes, consists of developing the approximately 2.7-acre existing parcel the construction of multi-family townhomes. The proposed structures will consist of conventionally framed, three-story, slab-on-grade townhomes. We have based our recommendations in this report that the anticipated foundation loads for the proposed structures will not exceed 5,000 pounds per linear foot for bearing walls, 50,000 pounds for column loads, and 100 pounds per square foot for floor slabs. If structural loads will be greater Earthtec should be notified so that we may review our recommendations and make modifications, if necessary.

In addition to the construction described above, we anticipate that utilities will be installed to service the proposed buildings, exterior concrete flatwork will be placed in the form of curb, gutter, and sidewalks.

4.0 GENERAL SITE DESCRIPTION

4.1 Site Description

At the time of our subsurface exploration the site was an undeveloped parcel used for agricultural. The ground surface appears to be relatively flat, we anticipate less than 3 feet of cut and fill may be required for site grading. The lot was surrounded on the west by a residential property, and on the north, south, and east by undeveloped properties.

4.2 Geologic Setting

The subject property is located in the northern portion of Utah Valley near the eastern shore of Utah Lake. Utah Valley is a deep, sediment-filled basin that is part of the Basin and Range Physiographic Province. The valley was formed by extensional tectonic processes during the Tertiary and Quaternary geologic time periods. The valley is bordered by the Wasatch Mountain Range on the east and the Lake Mountains on the west. Much of northwestern Utah, including Utah Valley, was previously covered by the Pleistocene age Lake Bonneville. Utah Lake, which currently covers much of the western portion of the valley, is a remnant of this ancient fresh water lake. The surficial geology of much of the eastern margin of the valley has been mapped by Constenius, 2011[1]. The surficial geology at the location of the subject site and adjacent properties is mapped as "Younger alluvial fan deposits" (Map Unit Qafy) dated to Holocene and upper Pleistocene. These soil or deposits are generally described in the referenced mapping as "Mostly sand, silt, and gravel that is poorly stratified and poorly sorted." However, a geologic hazard study was not performed for the subject site during this study.

[1] Constenius, K.N., Clark, D.L., King, J.K., Ehler, J.B., 2011, Interim Geologic Map of the Provo Quadrangle, Utah, Wasatch and Salt Lake Counties, Utah; U.S. Geological Survey, Open-File 586DM, Scale 1: 62,500.

5.0 SUBSURFACE EXPLORATION

5.1 Soil Exploration

Under the direction of a qualified member of our geotechnical staff, subsurface explorations were conducted at the site on September 15, 2020 by the boring of five (5) borings to depths of 6½ to 50½ feet below the existing ground surface using a a truck-mounted hydraulic drill rig. The approximate locations of the borings are shown on Figure No. 2, *Aerial Photograph Showing Location of Borings*. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 7, *Boring Log* at the end of this report. The stratification lines shown on the logs represent the approximate boundary between soil units; the actual transition may be gradual. Due to potential natural variations inherent in soil deposits, care should be taken in interpolating between and extrapolating beyond exploration points. A key to the symbols and terms on the logs is presented on Figure No. 8, *Legend*.

Samples of the subsurface soils were collected in the borings at depth intervals of approximately 2½ to 5 feet. Relatively undisturbed samples were collected by pushing thin-walled "Shelby" tubes into undisturbed soils below the augers. Disturbed samples were collected with a 1⅜ inch inside diameter split spoon sampler. The split spoon sampler was driven 18 inches into undisturbed soil with a 140-pound hammer free-falling through a distance of 30 inches. The blows required to drive the sampler through the final 12 inches of penetration is called the "N-value" or "blow count," and is recorded as "blows per foot" on the attached boring logs at the respective sample depths. The blows for each 6-inch interval (or less) are noted on the logs when more than 50 blows per 6 inches (or less) of sampler driving were achieved. The blow count provides a reasonable indication of the in-place relative density of sandy soils but provides only a limited indication of the relative stiffness of cohesive (clayey) materials, since the penetration resistance for these soils is a function of the moisture content. In gravelly soils, the blow count may be higher than it otherwise would be, particularly when one or more gravel particles are larger than the sampler diameter.

The soil samples collected were classified by visual examination in the field following the guidelines of the Unified Soil Classification System (USCS). The samples were transported to our Lindon, Utah laboratory where they will be retained for 30 days following the date of this report and then discarded, unless a written request for additional holding time is received prior to the 30-day limit.

6.0 LABORATORY TESTING

Representative soil samples collected during our field exploration were tested in the laboratory to assess pertinent engineering properties and to aid in refining field classifications, if needed. Tests performed included natural moisture contents, dry density tests, liquid and plastic limits determinations, mechanical (partial) gradation analyses, and one-dimensional consolidation tests. The laboratory test results are also included on the attached *Boring Logs* at the respective sample depths, and on Figure Nos. 9 through 10, *Consolidation-Swell Test.*

As part of the consolidation test procedure, water was added to the samples to assess moisture sensitivity when the samples were loaded to an equivalent pressure of approximately 1,000 psf. The native clay soils have a slight potential for collapse (settlement) and a slight potential for compressibility under increased moisture contents and anticipated load conditions.

A water-soluble sulfate test was performed on a representative sample obtained during our field exploration which indicated a value of 43 parts per million. Based on this result, the risk of sulfate attack to concrete appears to be "negligible" according to American Concrete Institute standards. Therefore, there are no restrictions on the type of Portland cement that may be used for concrete in contact with on-site soils. The results can be found in Appendix A.

7.0 SUBSURFACE CONDITIONS

7.1 Soil Types

On the surface of the site, we encountered topsoil which is estimated to extend about 2½ feet in depth at the boring locations. Below the topsoil we encountered layers of clay, silt, sand, and gravel extending to depths of 6½ to 50½ feet below the existing ground surface. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 7, *Boring Log* at the end of this report. Based on the blow counts obtained during field exploration, the clay and silt soils ranged from very soft to stiff in consistency and the sand and gravel soils had a relative density varying from loose to very dense.

It should be considered that a limited number of small diameter soil borings were used during the course of our subsurface exploration. Topsoil composition and contacts are difficult to determine from boring sampling. Variation in topsoil depths may occur at the site.

7.2 Collapsible Soils

Collapsible soils are typically characterized by a pinhole structure and relatively low unit weights. Foundations, floor slabs, and roadways supported on these soils may be susceptible to large settlements and structural distress when wetted.

In general, the development can be completed as long as special precautions are taken to minimize the potential for collapse of these soils. Measures to limit surface water from wetting supporting soils beneath foundations and floor slabs should be implemented. These measures include maintaining positive surface drainage away from the structures, downspouts should discharge away from foundations or be conveyed to suitable locations down gradient from the structures, minimizing landscape irrigation adjacent to structures, and ensuring proper and adequate compaction of foundation wall backfill.

7.3 Groundwater Conditions

Groundwater was encountered at depths of approximately 5 to 25 feet below the existing ground surface. Evidence of higher groundwater levels was observed in the soils at approximately 2½ feet to 7½ feet as iron oxide staining in Boring 2 (B-2). Note that groundwater levels will fluctuate in response to the season, precipitation, snow melt, irrigation, and other on and off-site influences. Quantifying these fluctuations would require long term monitoring, which is beyond the scope of this study. The contractor should be prepared to dewater excavations as needed.

8.0 SITE GRADING

8.1 General Site Grading

All surface vegetation and unsuitable soils (such as topsoil, organic soils, undocumented fill, soft, loose, or disturbed native soils, collapsible, and any other inapt materials) should be removed from below foundations, floor slabs, and exterior concrete flatwork. We encountered topsoil on the surface of the site. The topsoil (including soil with roots larger than about ¼ inch in diameter) should be completely removed, even if found to extend deeper, along with any other unsuitable soils that may be encountered. Over-excavations below footings and slabs also may be needed, as discussed in Section 10.0.

Fill placed over large areas, even if only a few feet in depth, can cause consolidation in the underlying native soils resulting in settlement of the fill. Because the site is relatively flat, we anticipate that less than 3 feet of grading fill will be placed. If more than 3 feet of grading fill will be placed above the existing surface (to raise site grades), Earthtec should be notified so that we may provide additional recommendations, if required. Such recommendations will likely include placing the fill several weeks (or possibly more) prior to construction to allow settlement to occur.

8.2 Temporary Excavations

Temporary excavations that are less than 4 feet in depth and above groundwater should have side slopes no steeper than ½H:1V (Horizontal:Vertical). Temporary excavations where water is encountered in the upper 4 feet or that extend deeper than 4 feet below site grades should be sloped or braced in accordance with OSHA[2] requirements for Type B soils.

8.3 Fill Material Composition

The native soils are not suitable for use as placed and compacted engineered fill. Excavated soils, including clay and silt, may be stockpiled for use as fill in landscape areas.

Structural fill is defined as imported fill material that will ultimately be subjected to any kind of structural loading, such as those imposed by footings, floor slabs, pavements, etc. Gradation requirements stated below shall be verified in intervals not exceeding 1,000 tons. We recommend that imported structural fill consist of sandy/gravelly soils meeting the following requirements in the table below:

[2] OSHA Health and Safety Standards, Final Rule, CFR 29, part 1926.

Table 1: Imported Structural Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
4 inches	100
3/4 inches	70 – 100
No. 4	40 – 80
No. 40	15 – 50
No. 200	0 – 20
Liquid Limit	35 maximum
Plasticity Index	15 maximum

Engineered fill is defined as reworked native material that will ultimately be subjected to any kind of structural loading, such as those imposed by footings, floor slabs, pavements. We recommend that a professional engineer or geologist verify that the engineered fill to be used on this project meets the requirements. Engineered fill should be clear of all organics, have a maximum particle size of 4 inches, less than 70 percent retained on the ¾-seive, a maximum Liquid Limit of 35, and a maximum Plasticity Index of 15.

In some situations, particles larger than 4 inches and/or more than 30 percent coarse gravel may be acceptable but would likely make compaction more difficult and/or significantly reduce the possibility of successful compaction testing. Consequently, stricter quality control measures than normally used may be required, such as using thinner lifts and increased or full-time observation of fill placement.

We recommend that utility trenches below any structural load be backfilled using structural fill or engineered fill. Local governments or utility companies required specification for backfill should be followed unless our recommendations stricter.

If native soil is used as fill material, the contractor should be aware that native clay and silt soils (as observed in the explorations) may be time consuming to compact due to potential difficulties in controlling the moisture content needed to obtain optimum compaction and changes proctor values.

If required (i.e. fill in submerged areas), we recommend that free draining granular material (clean sand and/or gravel) meet the following requirements in the table below:

Table 2: Free-Draining Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
3 inches	100
No. 10	0 – 25
No. 40	0 – 15
No. 200	0 – 5
Plasticity Index	Non-plastic

Three-inch minus washed rock (sometimes called river rock or drain rock) and pea gravel materials usually meet these requirements and may be used as free draining fill. If free draining fill will be placed adjacent to soil containing a significant amount of sand or silt/clay, precautions should be taken to prevent the migration of fine soil into the free draining fill. Such precautions should include either placing a filter fabric between the free draining fill and the adjacent soil material, or using a well-graded, clean filtering material approved by the geotechnical engineer.

8.4 Fill Placement and Compaction

The thickness of each lift should be appropriate for the compaction equipment that is used. We recommend a maximum lift thickness prior to compaction of 4 inches for hand operated equipment, 6 inches for most "trench compactors" and 8 inches for larger rollers, unless it can be demonstrated by in-place density tests that the required compaction can be obtained throughout a thicker lift. The full thickness of each lift of structural fill placed should be compacted to at least the following percentages of the maximum dry density, as determined by ASTM D-1557:

- In landscape and other areas not below structurally loaded areas: 90%
- Less than 5 feet of fill below structurally loaded areas: 95%
- 5 feet or greater of fill below structurally loaded areas: 98%

Generally, placing and compacting fill at moisture contents within ±2 percent of the optimum moisture content, as determined by ASTM D-1557, will facilitate compaction. Typically, the further the moisture content deviates from optimum the more difficult it will be to achieve the required compaction.

Fill should be tested frequently during placement and we recommend early testing to demonstrate that placement and compaction methods are achieving the required compaction. The contractor is responsible to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

8.5 Stabilization Recommendations

Near surface soils may rut and pump during grading and construction. The likelihood of rutting and/or pumping, and the depth of disturbance, is proportional to the moisture content in the soil, the load applied to the ground surface, and the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the ground surface by using lighter equipment, partially loaded equipment, tracked equipment, by working in dry times of the year, and/or by providing a working surface for equipment. However, because of the relatively shallow depth of groundwater, it is likely that rutting and pumping may not be avoidable.

During grading the soil in any obvious soft spots should be removed and replaced with granular material. If rutting or pumping occurs traffic should be stopped in the area of concern. The soil in rutted areas should be removed and replaced with granular material. In areas where pumping occurs the soil should either be allowed to sit until pore pressures dissipate (several hours to several days) and the soil firms up or be removed and replaced with granular material. Typically, we recommend removal to a minimum depth of 24 inches.

For granular material, we recommend using angular well-graded gravel, such as pit run, or crushed rock with a maximum particle size of four inches. We suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor. A finer granular material such as sand, gravelly sand, sandy gravel or road base may also be used. Materials which are more angular and coarse may require thinner lifts in order to achieve compaction. We recommend that the fines content (percent passing the No. 200 sieve) be less than 15%, the liquid limit be less than 35, and the plasticity index be less than 15.

Using a geosynthetic fabric, such as Mirafi 600X or equivalent, may also reduce the amount of material required and avoid mixing of the granular material and the subgrade. If a fabric is used, following removal of disturbed soils and water, the fabric should be placed over the bottom and up the sides of the excavation a minimum of 24 inches. The fabric should be placed in accordance with the manufacturer's recommendations, including proper overlaps. The granular material should then be placed over the fabric in compacted lifts. Again, we suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor.

9.0 SEISMIC AND GEOLOGIC CONSIDERATIONS

9.1 Seismic Design

The State of Utah has adopted the 2018 International Building Code (IBC) for seismic design and the structure should be designed in accordance with Chapter 16 of the IBC. Due to potentially liquefiable soils, Site Class F should be used if the structures have fundamental periods of vibration greater than 0.5s and a site response analysis will be required. If fundamental periods of vibration are less than or equal to 0.5s, we recommend using Site Class D (Default).

The site is located at approximately 40.363 degrees latitude and -111.777 degrees longitude. Using Site Class D (Default), the design spectral response acceleration parameters are given below.

Table 3: Design Accelerations

S_S	F_a	S_{MS}	S_{DS}	S_1
1.307 g	1.2	1.568 g	1.046 g	0.477 g

9.2 Faulting

The subject property is located within the Intermountain Seismic Belt where the potential for active faulting and related earthquakes is present. Based upon published geologic maps[3], no active faults traverse through or immediately adjacent to the site and the site is not located within local fault study zones. The nearest mapped fault trace is part of a group of faults beneath Utah Lake located about 2¼ miles southwest of the site.

[3] U.S. Geological Survey, Quaternary Fault and Fold Database of the United States, November 3, 2010.

9.3 Liquefaction Potential

According to current liquefaction maps[4] for Utah County, the site is located within an area designated as "High" in liquefaction potential. Liquefaction can occur when saturated subsurface soils below groundwater lose their inter-granular strength due to an increase in soil pore water pressures during a dynamic event such as an earthquake. Loose, saturated sands are most susceptible to liquefaction, but some loose, saturated gravels and relatively sensitive silt to low-plasticity silty clay soils can also liquefy during a seismic event. Subsurface soils encountered were composed of unsaturated and saturated silt, clay, sand and gravel soils. American Fork City requires a 70-foot-deep boring to access the liquefaction potential unless the site is located within 2,000 feet of a previously completed boring, then they require a 30-foot deep boring. Borings AF-06-13 and RBG-98-1 are located within 2,000 feet of the site.

As part of this study, the potential for liquefaction to occur in the soils we encountered was assessed using Youd *et al*[5] and Boulanger & Idriss[6]. Potential liquefaction-induced movements were evaluated using Tokimatsu & Seed[7] and Youd, Hansen & Bartlett[8]. Our analysis indicates that approximately up to 3 inches of liquefaction-induced settlement and possibly up to 1¼ feet of lateral spreading could occur during a moderate to large earthquake event. The liquefaction potential at the site can be mitigated by connecting/tying all footings together using reinforced grade beams and connect reinforced slabs to the footings so that the building will react as a cohesive unit. This may result in some tilting of the building due to differential liquefaction-induced movements. The building may also move laterally due to lateral spreading.

10.0 FOUNDATIONS

10.1 General

The foundation recommendations presented in this report are based on the soil conditions encountered during our field exploration, the results of laboratory testing of samples of the native soils, the site grading recommendations presented in this report, and the foundation loading conditions presented in Section 3.0, *Proposed Construction*, of this report. If loading conditions and assumptions related to foundations are significantly different, Earthtec should be notified so that we can re-evaluate our design parameters and estimates (higher loads may cause more

[4] Utah Geological Survey, Liquefaction-Potential Map for a Part of Utah County, Utah, Public Information Series 28, August 1994.
[5] Youd, T.L. (Chair), Idriss, I.M. (Co-Chair), and 20 other authors, 2001, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, October 2001, p. 817-833.
[6] Boulanger, R.W. and Idriss, I.M., 2006, Liquefaction Susceptibility Criteria for Silts and Clays, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, November 2006, p. 1413-1426.
[7] Tokimatsu, K. and Seed, H.B., 1987, Evaluation of Settlements in Sands due to Earthquake Shaking, Journal of Geotechnical Engineering, ASCE, p. 861-878.
[8] Youd, T.L., Hansen, C.M. and Bartlett, S.F., 2002, Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, December 2002, p. 1007-1017.

settlement), and to provide additional recommendations if necessary.

Conventional strip and spread footings may be used to support the proposed structures after appropriate removals as outlined in Section 8.1. Foundations should not be installed on topsoil, undocumented fill, debris, combination soils, organic soils, frozen soil, or in ponded water. If foundation soils become disturbed during construction, they should be removed or compacted.

10.2 Strip/Spread Footings

We recommend that conventional strip and spread foundations be constructed entirely on a minimum of 18 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils for structural loads up to 5,000 pounds per linear foot for bearing walls and up to 50,000 pounds for column loads. If loads exceed 5,000 pounds per linear foot for bearing walls, 50,000 pounds for column loads, and 100 pounds per square foot for floor slabs the specified structural fill depths are below. If loads exceed 5,000 pounds per linear foot for bearing walls or 80,000 pounds for column loads, we recommend using an alternative foundation system, such as rammed aggregate piers.

Table 4: Depth of Structural Fill

Structural Load (kips)	Depth of Structural Fill (in)
Up to 5 klf	18
Up to 50 kips	18
50 – 80 kips	60

For foundation design we recommend the following:

- Footings founded on a minimum of 18 inches of structural fill may be designed using a maximum allowable bearing capacity of 2,000 pounds per square foot. The values for vertical foundation pressure can be increased by one-third for wind and seismic conditions per Section 1806 when used with the Alternative Basic Load Combinations found in Section 1605.3.2 of the 2018 International Building Code.
- Continuous and spot footings should be uniformly loaded and should have a minimum width of 20 and 30 inches, respectively.
- Exterior footings should be placed below frost depth which is determined by local building codes. In general, 30 inches of cover is adequate for most sites; however local code should be verified by the end design professional. Interior footings, not subject to frost (heated structures), should extend at least 18 inches below the lowest adjacent grade.
- Foundation walls and footings should be properly reinforced to resist all vertical and lateral loads and differential settlement.
- The bottom of footing excavations should be compacted with at least 4 passes of an approved non-vibratory roller prior to erection of forms or placement of structural fill to densify soils that may have been loosened during excavation and to identify soft spots. If soft areas are

encountered, they should be stabilized as recommended in Section 8.5.

- Footing excavations should be observed by the geotechnical engineer prior to beginning footing construction to evaluate whether suitable bearing soils have been exposed and whether excavation bottoms are free of loose or disturbed soils.
- Structural fill used below foundations should extend laterally a minimum of 6 inches for every 12 vertical inches of structural fill placed. For example, if 18 inches of structural fill is required to bring the excavation to footing grade, the structural fill should extend laterally a minimum of 9 inches beyond the edge of the footings on both sides.

10.3 Estimated Settlements

If the proposed foundations are properly designed and constructed using the parameters provided above, we estimate that total settlements should not exceed one inch and differential settlements should be one-half of the total settlement over a 25-foot length of continuous foundation, for non-earthquake conditions. Additional settlement could occur during a seismic event due to ground shaking, if more than 3 feet of grading fill is placed above the existing ground surface, if loading conditions are greater than anticipated in Section 2, and/or if foundation soils are allowed to become wetted.

10.4 Lateral Load Resistance

Lateral loads are typically resisted by friction between the underlying soil and footing bottoms. Resistance to sliding may incorporate the friction acting along the base of foundations, which may be computed using a coefficient of friction of soils against concrete of 0.55 for structural fill meeting the recommendations presented herein. The values for lateral resistance can be increased by one-third for wind and seismic conditions per Section 1806.1 when used with the Alternative Basic Load Combinations found in Section 1605.3.2 of the 2015 International Building Code. The structures on this project will be slab-on-grade, therefore; lateral pressures is not required.

11.0 FLOOR SLABS AND FLATWORK

If shallow groundwater encountered at the site, lowest floor slab depths should be limited to existing site grades. This is intended to provide a minimum of 3 feet of separation between the observed groundwater condition and the bottom of the floor slab.

Concrete floor slabs and exterior flatwork may be supported on properly placed, compacted, and tested structural fill extending to undisturbed native soils after appropriate removals and grading as outlined in Section 8.1 are completed. We recommend placing a minimum of 4 inches of free-draining fill material (see Section 8.3) beneath floor slabs to facilitate construction, act as a capillary break, and aid in distributing floor loads. For exterior flatwork, we recommend placing a minimum of 4 inches of road-base material. Prior to placing the free-draining fill or road-base materials, the native sub-grade should be proof-rolled to identify soft spots, which should be stabilized as discussed above in Section 8.5.

For slab design, we recommend using a modulus of sub-grade reaction of 120 pounds per cubic inch. The thickness of slabs supported directly on the ground shall not be less than 3½ inches. A 6-mil polyethylene vapor retarder with joints lapped not less than 6 inches shall be placed between the ground surface and the concrete, as per Section 1907.1 of the 2015 International Building Code.

To help control normal shrinkage and stress cracking, we recommend that floor slabs have adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints, frequent crack control joints, and non-rigid attachment of the slabs to foundation and bearing walls. Special precautions should be taken during placement and curing of all concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking, spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and practices.

12.0 DRAINAGE

12.1 Surface Drainage

Due to the collapse potential of native soils, wetting of subsurface soils (including those below foundations) could result in adverse settlement. Accordingly, we recommend the following:

- The contractor should take precautions to prevent significant wetting of the soil at the base of the excavation. Such precautions may include: grading to prevent runoff from entering the excavation, excavating during normally dry times of the year, covering the base of the excavation if significant rain or snow is forecast, backfill at the earliest possible date, frame floors and/or the roof at the earliest possible date, other precautions that might become evident during construction.
- Adequate compaction of foundation wall backfill must be provided i.e. a minimum of 90% of ASTM D-1557. Water consolidation methods should not be used.
- The ground surface should be graded to drain away from the building in all directions. We recommend a minimum fall of 8 inches in the first 10 feet.
- Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits, or at least 10 feet from foundations, whichever is greater.
- Sprinkler nozzles should be aimed away, and all sprinkler components kept at least 5 feet, from foundation walls. A drip irrigation system may be utilized in landscaping areas within 10 feet of foundation walls to minimize water intrusion at foundation backfill. Also, sprinklers should not be placed at the top or on the face of slopes. Sprinkler systems should be designed

with proper drainage and well maintained. Over-watering should be avoided.

- Any additional precautions which may become evident during construction.

12.2 Subsurface Drainage

Walls or portions thereof that retain earth and enclose interior spaces and floors below grade shall conform to Section 1805 of the 2018 International Building Code for damp proofing and water proofing.

13.0 GENERAL CONDITIONS

The exploratory data presented in this report was collected to provide geotechnical design recommendations for this project. The explorations may not be indicative of subsurface conditions outside the study area or between points explored and thus have a limited value in depicting subsurface conditions for contractor bidding. Variations from the conditions portrayed in the explorations may occur and which may be sufficient to require modifications in the design. If during construction, conditions are different than presented in this report, Earthtec should be advised immediately so that the appropriate modifications can be made.

The findings and recommendations presented in this geotechnical report were prepared in accordance with generally accepted geotechnical engineering principles and practice in this area of Utah at this time. No warranty or representation is intended in our proposals, contracts, letters, or reports. Failure to consult with Earthtec regarding any changes made during design and/or construction of the project from those discussed herein relieves Earthtec from any liability arising from changed conditions at the site.

This geotechnical report is based on relatively limited subsurface explorations and laboratory testing. Subsurface conditions may differ in some locations of the site from those described herein, which may require additional analyses and possibly modified recommendations. Thus, we strongly recommend consulting with Earthtec regarding any changes made during design and construction of the project from those discussed herein. Failure to consult with Earthtec regarding any such changes relieves Earthtec from any liability arising from changed conditions at the site.

To maintain continuity, Earthtec should also perform materials testing and special inspections for this project. The recommendations presented herein are based on the assumption that an adequate program of tests and observations will be followed during construction to verify compliance with our recommendations. We also assume that we will review the project plans and specifications to verify that our conclusions and recommendations are incorporated and remain appropriate (based on the actual design). Earthtec should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Earthtec also should be retained to provide observation and testing services during grading, excavation, foundation construction, and other earth-related construction phases of the project.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please contact Earthtec at your convenience.

Respectfully;

EARTHTEC ENGINEERING

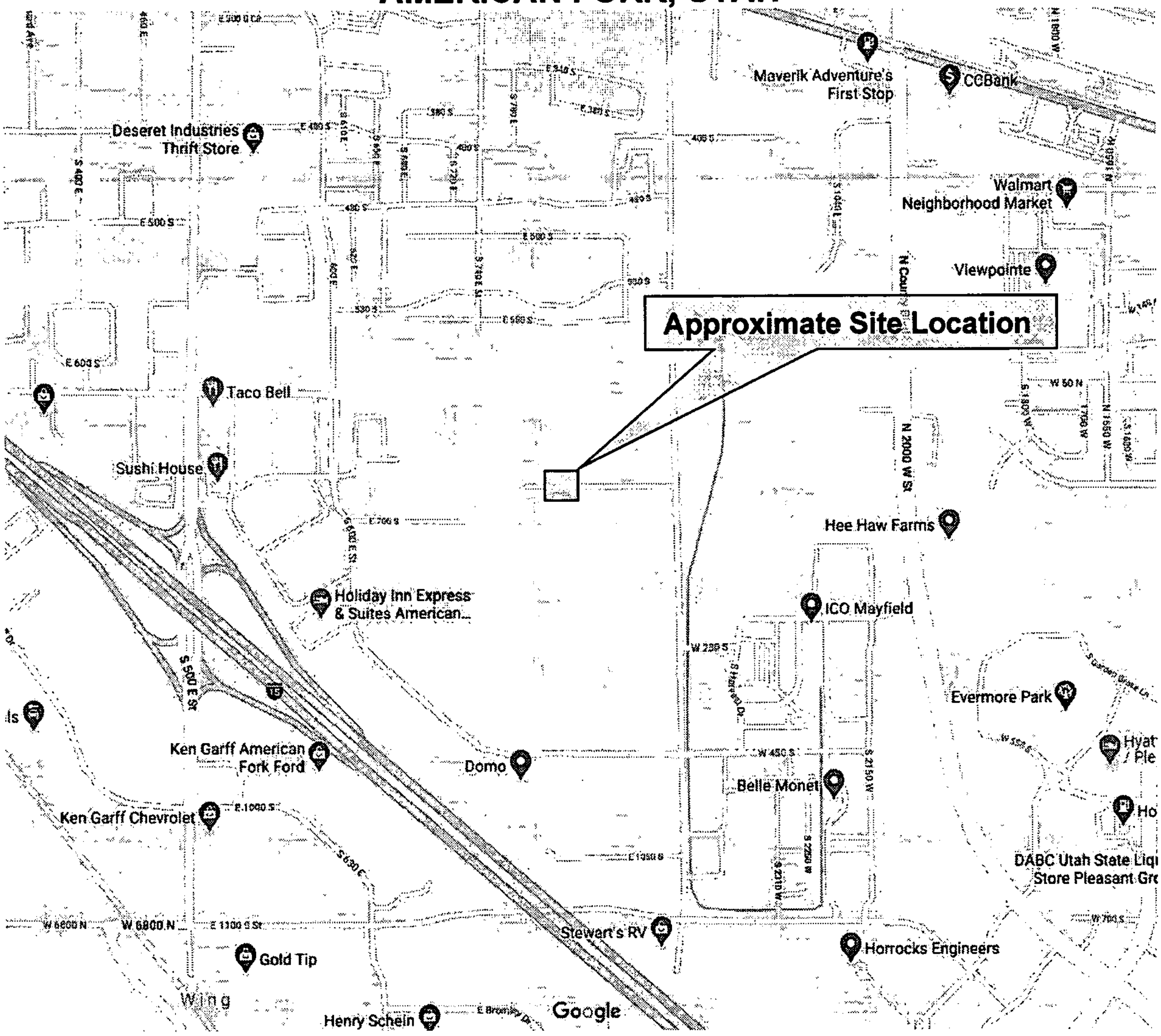
PROFESSIONAL ENGINEER
No. 5567049-2202
TIMOTHY ALLAN MITCHELL
Electronically generated on
10/12/2020
STATE OF UTAH

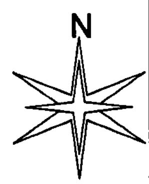
Jeremy A. Balleck, E.I.T.
Staff Engineer

Timothy A. Mitchell, P.E.
Senior Geotechnical Engineer

VICINITY MAP

AMERICAN FORK PROPERTY
650 SOUTH 700 EAST
AMERICAN FORK, UTAH

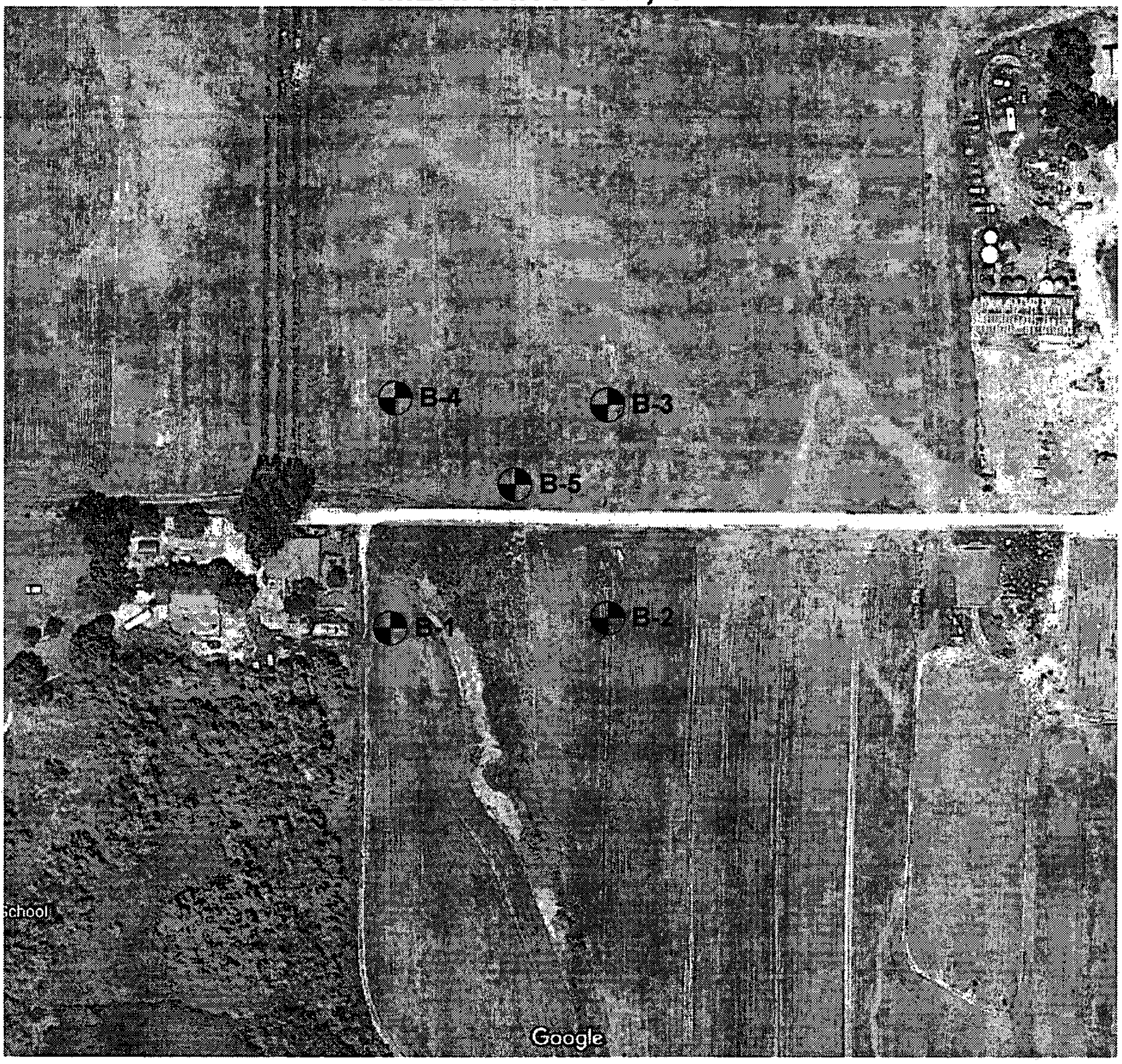




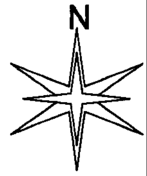
PROJECT NO.: 208741	EARTHTEC ENGINEERING	FIGURE NO.: 1

AERIAL PHOTOGRAPH SHOWING LOCATION OF BORINGS

AMERICAN FORK PROPERTY
650 SOUTH 700 EAST
AMERICAN FORK, UTAH



Approximate Boring Locations



PROJECT NO.: 208741	EARTHTEC ENGINEERING	**FIGURE NO.:** 2

BORING LOG

NO.: B-1

PROJECT: American Fork Property
PROJECT NO.: 208741
CLIENT: Brighton Homes
DATE: 09/15/20
LOCATION: See Figure 2
ELEVATION: Not Measured
OPERATOR: Great Basin
LOGGED BY: S. Roberts
EQUIPMENT: Truck Mounted Drill Rig
DEPTH TO WATER; INITIAL ▽ :
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
0			TOPSOIL, lean clay, moist, brown										
3		CL	Lean CLAY, very soft, moist, brown		1								
6		CL	Sandy Lean CLAY, very soft, moist, brown		2	39				14	35	51	
			Maximum depth explored approximately 6½ feet										
9													
12													
15													
18													
21													
24													
27													

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 208741

EARTHTEC ENGINEERING

FIGURE NO.: 3

BORING LOG

NO.: B-2

PROJECT: American Fork Property
CLIENT: Brighton Homes
LOCATION: See Figure 2
OPERATOR: Great Basin
EQUIPMENT: Truck Mounted Drill Rig
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 208741
DATE: 09/15/20
ELEVATION: Not Measured
LOGGED BY: S. Roberts
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
0			TOPSOIL, silt, slightly moist, brown										
3		SC	Clayey SAND, medium dense, slightly moist, brown, oxide stains		14								
					13								
6		CL	Lean CLAY with sand, soft, moist, brown, roots		3	28		28	8	1	25	74	
9					3								
12													
15		ML	SILT with sand, medium stiff, moist, gray			35	85	34	7	1	18	81	C
18													
21					8								
			Maximum depth explored approximately 21½ feet										
24													
27													

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

LOG OF TESTHOLE LOGS.GPJ EARTHTEC.GDT 10/12/20

PROJECT NO.: 208741

EARTHTEC ENGINEERING

FIGURE NO.: 4

BORING LOG

NO.: B-3

PROJECT: American Fork Property
CLIENT: Brighton Homes
LOCATION: See Figure 2
OPERATOR: Great Basin
EQUIPMENT: Truck Mounted Drill Rig
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 208741
DATE: 09/15/20
ELEVATION: Not Measured
LOGGED BY: S. Roberts
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
0			TOPSOIL, silt, dry, brown										
3		SP-SM	Poorly Graded SAND with silt and gravel, medium dense to dense, dry, tan	◢	72								
6				◢	45	2				41	47	12	
			Maximum depth explored approximately 6½ feet										
9													
12													
15													
18													
21													
24													
27													

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 208741

EARTHTEC ENGINEERING

FIGURE NO.: 5

BORING LOG
NO.: B-4

PROJECT: American Fork Property | **PROJECT NO.:** 208741
CLIENT: Brighton Homes | **DATE:** 09/15/20
LOCATION: See Figure 2 | **ELEVATION:** Not Measured
OPERATOR: Great Basin | **LOGGED BY:** S. Roberts
EQUIPMENT: Truck Mounted Drill Rig
DEPTH TO WATER; INITIAL ▽ : | **AT COMPLETION ▼ : 5 ft.**

Depth (Ft.)	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
0		TOPSOIL, silt, dry, brown										
3	GM	Silty GRAVEL with sand, loose to dense, slightly moist to wet, gray to brown	◤	36								
5		▼										
6			◤	19								
9			◤	11								
11			◤	8	15		17	NP	44	33	23	
15			◤	5								
21			◤	48								
21½		Maximum depth explored approximately 21½ feet										
24												
27												

Notes: Groundwater encountered at approximately 5 feet.

Tests Key
- CBR = California Bearing Ratio
- C = Consolidation
- R = Resistivity/Nitrates/PH
- DS = Direct Shear
- SS = Soluble Sulfates
- UC = Unconfined Compressive Strength

PROJECT NO.: 208741 | EARTHTEC ENGINEERING | **FIGURE NO.:** 6

LOG OF TESTHOLE LOGS.GPJ EARTHTEC.GDT 10/12/20

BORING LOG

NO.: B-5

PROJECT:	American Fork Property	**PROJECT NO.:**	208741
CLIENT:	Brighton Homes	**DATE:**	09/15/20
LOCATION:	See Figure 2	**ELEVATION:**	Not Measured
OPERATOR:	Great Basin	**LOGGED BY:**	S. Roberts
EQUIPMENT:	Truck Mounted Drill Rig		
DEPTH TO WATER; INITIAL ▽ :		**AT COMPLETION ▼ :**	25 ft.

Depth (Ft.)	USCS	Description	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
0		TOPSOIL, silt, dry, brown									
3	CL	Lean CLAY with gravel, medium stiff, moist, brown	5								
6	GM	Silty GRAVEL with sand, medium dense to very loose, moist, brown	13								
9			2								
12	ML	Sandy SILT, stiff, moist, brown		33	100	22	NP	3	41	56	C
15			9								
21			11								
24	SC	Clayey SAND, medium dense, wet, brown	13								
27											

Notes: Groundwater encountered at approximately 25 feet.

Tests Key

- CBR = California Bearing Ratio
- C = Consolidation
- R = Resistivity/Nitrates/PH
- DS = Direct Shear
- SS = Soluble Sulfates
- UC = Unconfined Compressive Strength

PROJECT NO.: 208741

FIGURE NO.: 7a

BORING LOG

NO.: B-5

PROJECT: American Fork Property — **PROJECT NO.:** 208741
CLIENT: Brighton Homes — **DATE:** 09/15/20
LOCATION: See Figure 2 — **ELEVATION:** Not Measured
OPERATOR: Great Basin — **LOGGED BY:** S. Roberts
EQUIPMENT: Truck Mounted Drill Rig
DEPTH TO WATER; INITIAL ∇ : — **AT COMPLETION ▼ :** 25 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
27		SC	Clayey SAND, medium dense, wet, brown										
30		GM	Silty GRAVEL with sand, dense, wet, brown		49								
33													
36		SP	Poorly Graded SAND with gravel, medium dense to very dense, wet, brown		17								
39													
41					31								
42													
45													
46					10								
48													
50					50-4"								
51			Maximum depth explored approximately 50½ feet due to equipment refusal										
54													

Notes: Groundwater encountered at approximately 25 feet.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

LEGEND

PROJECT: American Fork Property **DATE:** 09/15/20
CLIENT: Brighton Homes **LOGGED BY:** S. Roberts

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR SOIL DIVISIONS			USCS SYMBOL	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 50% retaining on No. 200 Sieve)	GRAVELS (More than 50% of coarse fraction retained on No. 4 Sieve)	CLEAN GRAVELS (Less than 5% fines)	GW	Well Graded Gravel, May Contain Sand, Very Little Fines
			GP	Poorly Graded Gravel, May Contain Sand, Very Little Fines
		GRAVELS WITH FINES (More than 12% fines)	GM	Silty Gravel, May Contain Sand
			GC	Clayey Gravel, May Contain Sand
	SANDS (50% or more of coarse fraction passes No. 4 Sieve)	CLEAN SANDS (Less than 5% fines)	SW	Well Graded Sand, May Contain Gravel, Very Little Fines
			SP	Poorly Graded Sand, May Contain Gravel, Very Little Fines
		SANDS WITH FINES (More than 12% fines)	SM	Silty Sand, May Contain Gravel
			SC	Clayey Sand, May Contain Gravel
FINE GRAINED SOILS (More than 50% passing No. 200 Sieve)	SILTS AND CLAYS (Liquid Limit less than 50)		CL	Lean Clay, Inorganic, May Contain Gravel and/or Sand
			ML	Silt, Inorganic, May Contain Gravel and/or Sand
			OL	Organic Silt or Clay, May Contain Gravel and/or Sand
	SILTS AND CLAYS (Liquid Limit Greater than 50)		CH	Fat Clay, Inorganic, May Contain Gravel and/or Sand
			MH	Elastic Silt, Inorganic, May Contain Gravel and/or Sand
			OH	Organic Clay or Silt, May Contain Gravel and/or Sand
HIGHLY ORGANIC SOILS			PT	Peat, Primarily Organic Matter

SAMPLER DESCRIPTIONS

- SPLIT SPOON SAMPLER (1 3/8 inch inside diameter)
- MODIFIED CALIFORNIA SAMPLER (2 inch outside diameter)
- SHELBY TUBE (3 inch outside diameter)
- BLOCK SAMPLE
- BAG/BULK SAMPLE

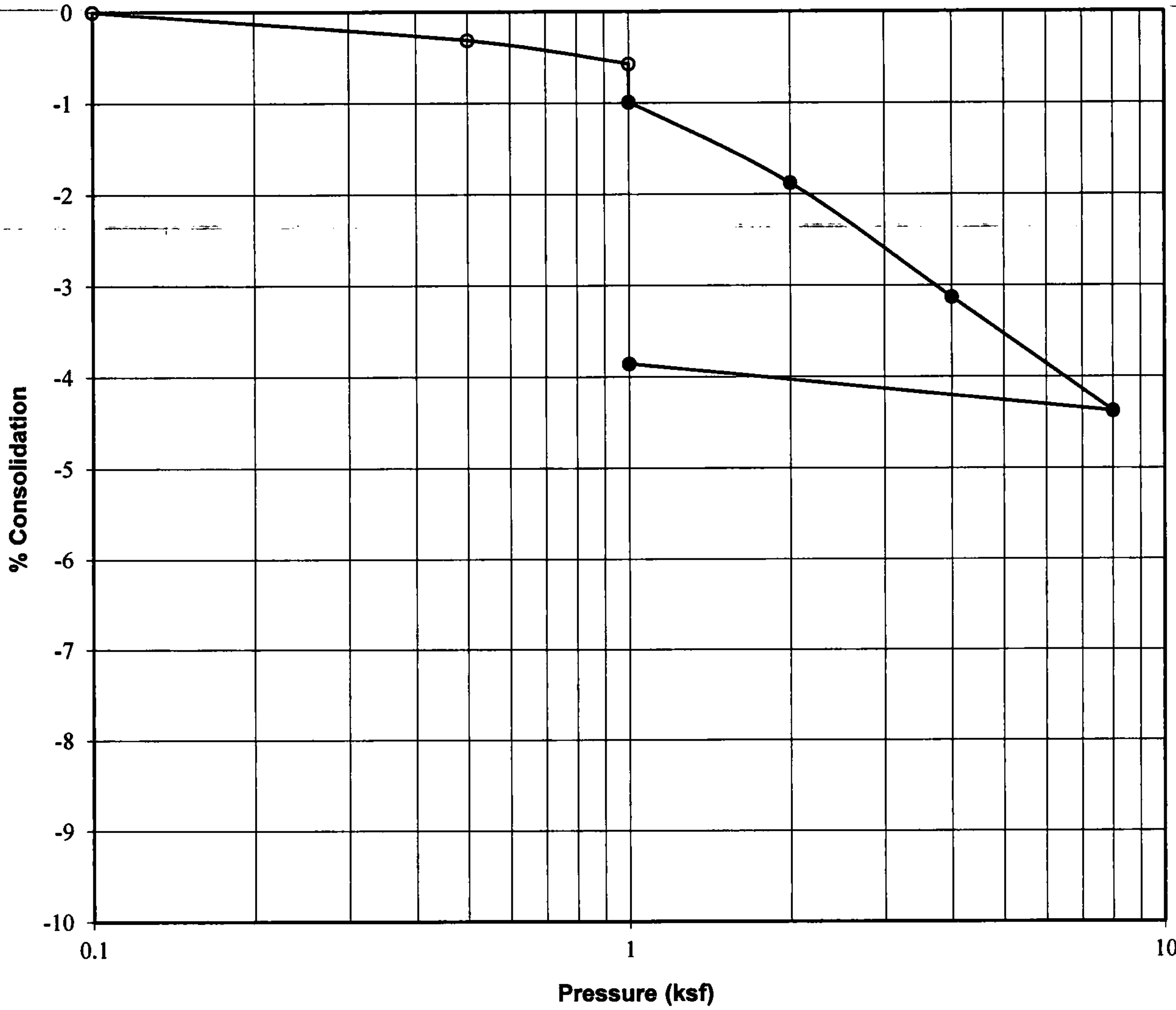
WATER SYMBOLS

- ∇ Water level encountered during field exploration
- ▼ Water level encountered at completion of field exploration

NOTES:
1. The logs are subject to the limitations, conclusions, and recommendations in this report.
2. Results of tests conducted on samples recovered are reported on the logs and any applicable graphs.
3. Strata lines on the logs represent approximate boundaries only. Actual transitions may be gradual.
4. In general, USCS symbols shown on the logs are based on visual methods only: actual designations (based on laboratory tests) may vary.

PROJECT NO.: 208741 EARTHTEC ENGINEERING **FIGURE NO.:** 8

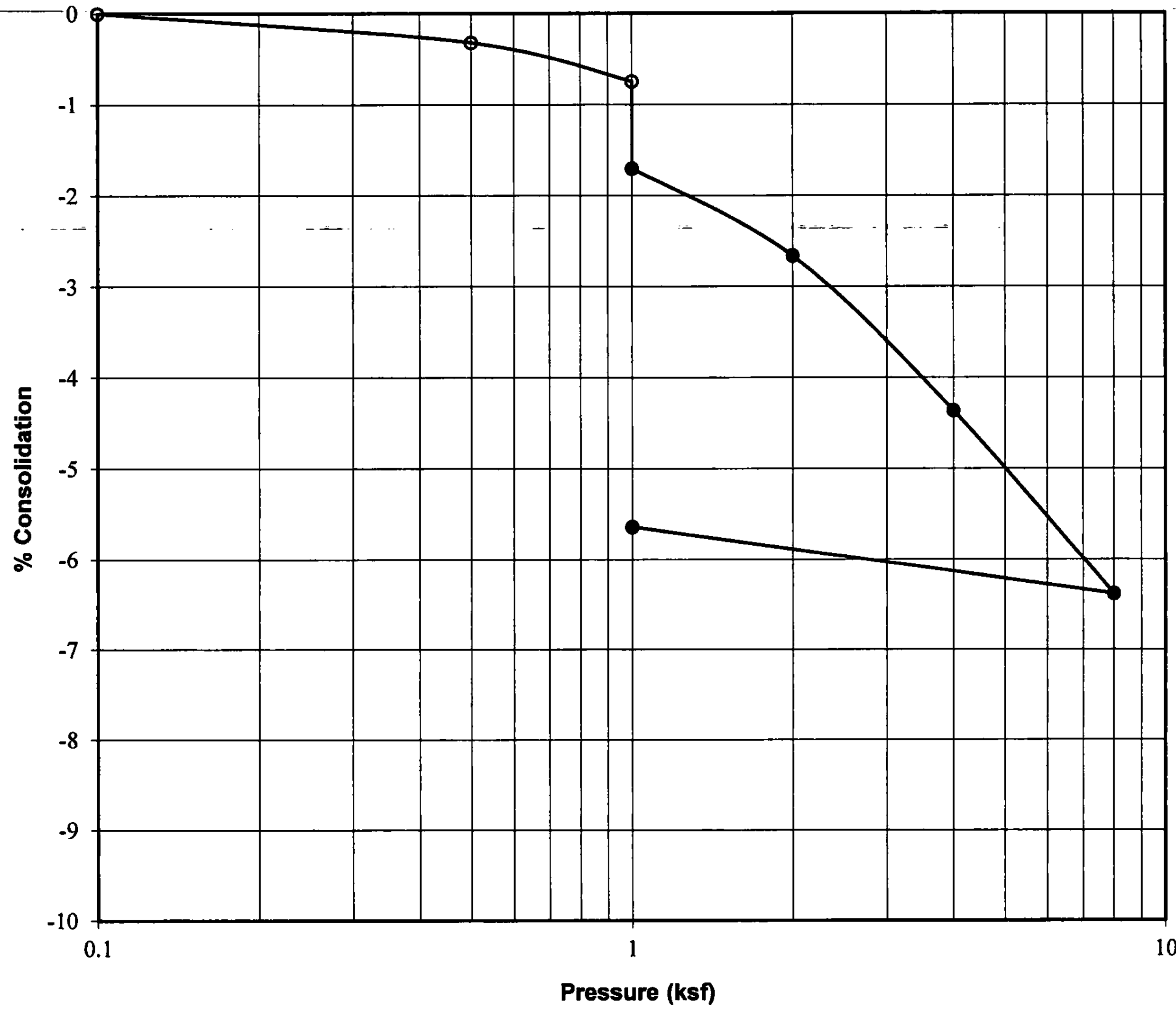
CONSOLIDATION - SWELL TEST



Project:	American Fork Property
Location:	B-2
Sample Depth, ft:	15
Description:	Shelby
Soil Type:	Silt with sand (ML)
Natural Moisture, %:	35
Dry Density, pcf:	85
Liquid Limit:	34
Plasticity Index:	7
Water Added at:	1 ksf
Percent Collapse:	0.4

PROJECT NO.: 208741	EARTHTEC ENGINEERING	**FIGURE NO.:** 9

CONSOLIDATION - SWELL TEST



Project:	American Fork Property
Location:	B-5
Sample Depth, ft:	10
Description:	Shelby
Soil Type:	Sandy SILT (ML)
Natural Moisture, %:	33
Dry Density, pcf:	100
Liquid Limit:	22
Plasticity Index:	NP
Water Added at:	1 ksf
Percent Collapse:	1.0

PROJECT NO.: 208741	EARTHTEC ENGINEERING	**FIGURE NO.:** 10

APPENDIX A

Timpview Analytical Laboratories
A Chemtech-Ford, Inc. Affiliate
1384 West 130 South Orem, UT 84058 (801) 229-2282

Certificate of Analysis

Earth Tech, LLC (dba Earthtec)
Jeremy Balleck
1497 W 40 S
Lindon, UT 84042
DW System # :

Work Order #: 2011157
PO# / Project Name: 808741
Receipt: 9/17/20 15:20
Batch Temp °C: 26.1
Date Reported: 9/24/2020

Sample Name: **B-5 @ 2.5**
Collected: 9/15/20 12:00 **Matrix:** Solid **Collected By:** Sterling Roberts

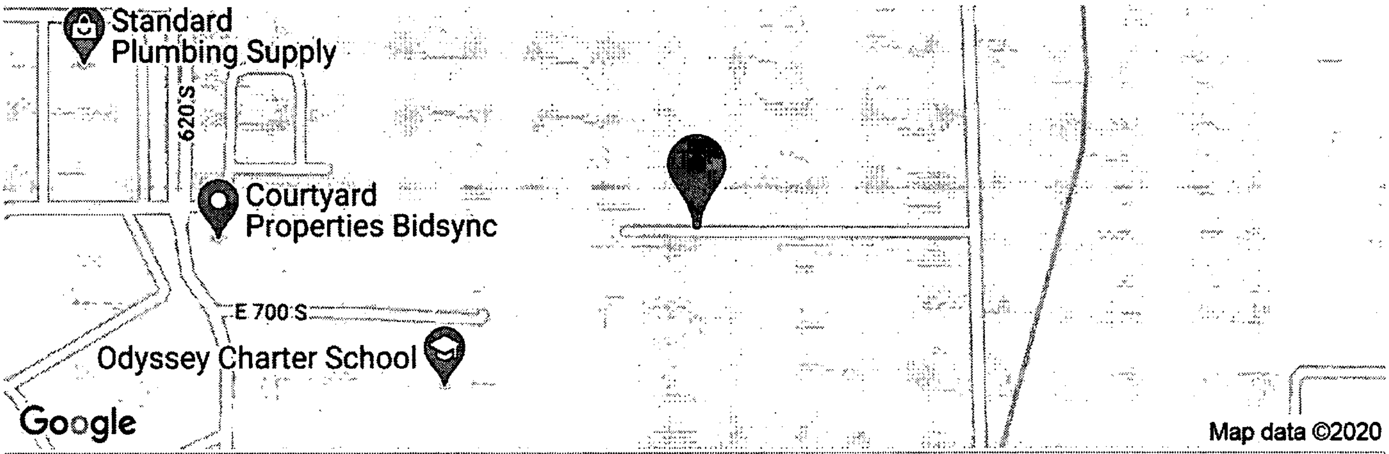
Parameter	Lab ID #	Method	Analysis Date / Time	Result	Units	MRL	Flags
Sulfate, Soluble (IC)	2011157-01	EPA 300.0	9/21/20	43	mg/kg dry	11	
Total Solids	2011157-01	SM 2540G	9/23/20	89.6	%	0.1	

Comment:

Reviewed by: Joyce Applegate
Joyce Applegate, Project Manager

OSHPD

Latitude, Longitude: 40.362708, -111.777084



Date	10/9/2020, 11:24:26 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	1.307	MCE_R ground motion. (for 0.2 second period)
S_1	0.477	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.568	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.046	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.592	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.71	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.307	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.505	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	3.101	Factored deterministic acceleration value. (0.2 second)
S1RT	0.477	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.539	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.261	Factored deterministic acceleration value. (1.0 second)
PGAd	1.224	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.868	Mapped value of the risk coefficient at short periods
C_{R1}	0.885	Mapped value of the risk coefficient at a period of 1 s

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Project: American Fork Property 10/12/2020
Job No. 208741

Bearing Capacity after Meyerhoff[1]

Allowable Bearing Pressure, $q_{all} = (cN_c s_c d_c + \gamma D N_q s_q d_q + 0.5\gamma B N_\gamma s_\gamma d_\gamma r_\gamma)/(F.S.) \leq q_l$

Friction Angle, ϕ =	28	degrees				N_q =	14.7	$= e^{(\pi \tan\phi)} \tan^2(45+\phi/2)$
Cohesion, c =	0	psf				N_c =	25.8	$= (N_q - 1) \cot \phi$
Effective Unit Weight, γ =	120	pcf	=	18.9	kN/m2	N_g =	11.2	$= (N_q - 1) \tan(1.4\phi)$
Longest Wall Footing Length, L =	25	ft	=	7.6	m	K_p =	2.8	$= \tan^2(45+\phi/2)$
Bearing Pressure Limit, q_l =	2	ksf	=	0.1	mPa			
F.S. =	3.0							shaded areas indicate input values

SUMMARY TABLES

Allowable Wall Footing Bearing Capacity, q_{all} - ksf

Footing Depth, D - ft	Structural Fill Depth, D_f - ft	Width - ft 1.50	1.67	1.83	2.00	2.50	3.00	3.50	4.00	4.50	5.00
2.50	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
4.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
2.50	1.50	4.24	4.02	3.86	3.71	3.39	3.18	3.03	2.92	2.83	2.76
4.00	5.00	10.40	9.59	8.96	8.40	7.20	6.40	5.83	5.40	5.07	4.80

Allowable Square Column Footing Bearing Capacity, q_{all} - ksf

Footing Depth, D - ft	Structural Fill Depth, D_f - ft	Width - ft 2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00
1.00	0.00	1.56	1.70	1.84	1.97	2.00	2.00	2.00	2.00	2.00	2.00
2.50	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1.00	1.50	4.00	3.82	3.75	3.73	3.56	3.38	3.24	3.13	3.03	2.95
2.50	1.50	5.12	4.50	4.08	3.78	3.56	3.38	3.24	3.13	3.03	2.95

1Bowles, Joseph E.; Foundation Analyses and Design; McGraw-Hill; 1988; pgs: 187-196

using Bowles bearing capacity reduction method (r_γ = 1- 0.25 log (B/6), B ≥ 6 ft.).

Wall (Strip) Footing

Width, B =	1.50	1.67	1.83	2.00	2.50	3.00	3.50	4.00	4.50	5.00
s_c =	1.03	1.04	1.04	1.04	1.06	1.07	1.08	1.09	1.10	1.11
$s_q = s_\gamma$ =	1.02	1.02	1.02	1.02	1.03	1.03	1.04	1.04	1.05	1.06
Depth, D =	2.5									
d_c =	1.55	1.50	1.45	1.42	1.33	1.28	1.24	1.21	1.18	1.17
$d_q = d_\gamma$ =	1.28	1.25	1.23	1.21	1.17	1.14	1.12	1.10	1.09	1.08
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
q_{ult} =	7.0	7.0	7.1	7.1	7.3	7.6	7.9	8.2	8.5	8.9
q_{all} =	2.3	2.3	2.4	2.4	2.4	2.5	2.6	2.7	2.8	3.0
Depth, D =	4									
d_c =	1.89	1.80	1.73	1.67	1.53	1.44	1.38	1.33	1.30	1.27
$d_q = d_\gamma$ =	1.44	1.40	1.36	1.33	1.27	1.22	1.19	1.17	1.15	1.13
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
q_{ult} =	11.8	11.7	11.5	11.5	11.4	11.5	11.6	11.9	12.2	12.5
q_{all} =	3.9	3.9	3.8	3.8	3.8	3.8	3.9	4.0	4.1	4.2

Square Column Footing

Width, B =	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00
Depth, D =	1.00									
d_c =	1.13	1.11	1.10	1.08	1.07	1.07	1.06	1.06	1.05	1.05
$d_q = d_\gamma$ =	1.07	1.06	1.05	1.04	1.04	1.03	1.03	1.03	1.03	1.02
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98
q_{ult} =	4.7	5.1	5.5	5.9	6.3	6.8	7.2	7.6	8.0	8.4
q_{all} =	1.6	1.7	1.8	2.0	2.1	2.3	2.4	2.5	2.7	2.8
Depth, D =	2.5									
d_c =	1.33	1.28	1.24	1.21	1.18	1.17	1.15	1.14	1.13	1.12
$d_q = d_\gamma$ =	1.17	1.14	1.12	1.10	1.09	1.08	1.08	1.07	1.06	1.06
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98
q_{ult} =	9.1	9.3	9.7	10.0	10.4	10.8	11.1	11.5	11.9	12.2
q_{all} =	3.0	3.1	3.2	3.3	3.5	3.6	3.7	3.8	4.0	4.1

Project:	American Fork Property		
Location:	See Figure 2, Utah	Calcs By:	WGT
Project No:	208741	References:	Reviewed By:
Date:	10/12/20	1. Youd, et al, 2001.	C_E = 1.02
Drill Rig Code:	L3	2. Boulanger & Idriss, 2006.	C_B = 1.05
Borehole Diameter, inches:	7	3. Bray & Sancio, 2006.	C_S = 1.20
Sampler without liners?:	yes	Magnitude Scaling Factor, MSF =	1.00
Fill Height, feet:	0	$R^* = R + 10^{(0.89M_w - 5.64)}$ =	14.3
Magnitude, Mw:	7.5	ModCal Sampler Conver. Factor (*) =	0.77
Peak Horiz. Acceleration, amax:	0.592	Use representative tests for layers?	yes
Distance from site to fault, km:	3.5	Enter Ground Slope %:	0.001
Reference atmosphere value,tsf:	1.05811	Enter W=Ht/Distance to free face,%:	

LATERAL SPREADING VALUES

Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft	Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft	Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft
B-1	0,0.00	0.000	0.0								
B-2	0,0.00	0.000	0.0								
B-3	0,0.00	0.000	0.0								
B-4	23.,1.52	0.234	**1.1**								
B-5	0,1.52	1.000	0.0								

TOTAL SETTLEMENT VALUES

Boring	Sett., in.	Boring	Sett., in.	Boring	Sett., in.
B-1	0.0				
B-2	0.0				
B-3	0.0				
B-4	**2.6**				
B-5	**2.8**				

Boring No.	Water Depth, feet	Sample Depth, feet	USC	% Fines	Unit Weight, pcf	Pore Press., tsf	Total Stress tsf	Effective Stress tsf	Rod Length, feet	Meas. N-value N_m	Rod Correct. C_R	Ovrbrdn Correct. C_N	$(N_1)_{60}$	$(N_1)_{60cs}$	r_d	$CRR_{7.5}$	CSR	(>1) F.S.	F.S. = ($CRR_{7.5}$ / CSR) MSF (<=1) F.S.	Moisture Content %	Liquid Limit	Plast. Index	Will It Liquefy By: Bout/Idriss Criteria?	Bray/Sancio Criteria?	Volum. Strain %	Layer Thick. feet	Layer Settlmnt, inches
B-1	200	3.5	CL	85	112	0.000	0.196	0.196	5	1	0.75	1.59	1.5	6.8	0.99	0.09	0.38	(Clay)					NO				
	200	6	CL	51	112	0.000	0.336	0.336	10	2	0.80	1.45	3.0	8.6	0.99	0.10	0.38	(Clay)		39			NO				
B-2	200	3.5	SC	12	117	0.000	0.205	0.205	5	14	0.75	1.58	21.2	23.4	0.99	0.26	0.38	(Clay)					NO				
	200	6	SC	12	117	0.000	0.351	0.351	10	13	0.80	1.44	19.1	21.3	0.99	0.23	0.38	(Clay)					NO				
	200	8.5	CL	74	112	0.000	0.476	0.476	10	3	0.80	1.33	4.1	9.9	0.98	0.11	0.38	(Clay)		28	28	8	NO	YES			
	200	11	CL	74	112	0.000	0.616	0.616	15	3	0.85	1.23	4.0	9.8	0.97	0.11	0.37	(Clay)		28	28	8	NO	YES			
	200	16	ML	81	115	0.000	0.920	0.920	20	4	0.85	1.06	4.6	10.5	0.96	0.12	0.37	N/A		35	34	7	NO	YES			
	200	21	ML	81	115	0.000	1.208	1.208	25	8	0.95	0.94	9.1	15.9	0.95	0.17	0.37	N/A		35	34	7	NO	YES			
B-3	200	3.5	SP-SM	12	129	0.000	0.226	0.226	5	72	0.75	1.56	107.7	112.7	0.99	(N>30)	0.38	N/A		2							
	200	6	SP-SM	12	126	0.000	0.378	0.378	10	45	0.80	1.41	65.2	68.8	0.99	(N>30)	0.38	N/A		2							
B-4	5	3.5	GM	23	124	0.000	0.217	0.217	5	36	0.75	1.57	54.2	63.7	0.99	(N>30)	0.38	N/A		15	17	2	YES	YES			
	5	6	GM	23	119	0.031	0.357	0.326	10	19	0.80	1.46	28.4	35.3	0.99	(N>30)	0.42	N/A		15	17	2	YES	YES			
	5	8.5	GM	23	116	0.109	0.493	0.384	10	11	0.80	1.41	15.9	21.5	0.98	0.24	0.48		**0.49**	15	17	2	YES	YES	1.4	2.5	0.4
	5	11	GM	23	115	0.187	0.633	0.445	15	8	0.85	1.36	11.8	17.1	0.97	0.18	0.53		**0.34**	15	17	2	YES	YES	1.7	3.75	0.8
	5	16	GM	23	113	0.343	0.904	0.561	20	5	0.85	1.27	6.9	11.7	0.96	0.13	0.60		**0.21**	15	17	2	YES	YES	2.3	5	1.4
	5	21	GM	23	126	0.499	1.323	0.824	25	48	0.95	1.11	65.0	75.5	0.95	(N>30)	0.59	N/A		15	17	2	YES	YES			
B-5	25	3.5	CL	70	113	0.000	0.198	0.198	5	5	0.75	1.59	7.6	14.1	0.99	0.15	0.38	(Clay)					NO				
	25	6	GM	12	117	0.000	0.351	0.351	10	13	0.80	1.44	19.1	21.3	0.99	0.23	0.38		**AWT**								
	25	8.5	GM	12	112	0.000	0.476	0.476	10	2	0.80	1.33	2.7	4.4	0.98	0.07	0.38		**AWT**								
	25	11	ML	56	133	0.000	0.732	0.732	15	4	0.85	1.16	5.1	11.1	0.97	0.12	0.37		**AWT**	33	22	2	YES	YES			
	25	16	ML	56	115	0.000	0.920	0.920	20	9	0.85	1.06	10.4	17.5	0.96	0.19	0.37		**AWT**	33	22	2	YES	YES			
	25	21	ML	56	116	0.000	1.218	1.218	25	11	0.95	0.94	12.5	20.0	0.95	0.22	0.37		**AWT**	33	22	2	YES	YES			
	25	26	SC	12	117	0.031	1.521	1.490	30	13	0.95	0.84	13.3	15.3	0.94	0.16	0.37	(Clay)					NO				
	25	31	GM	12	126	0.187	1.953	1.766	35	49	1.00	0.77	48.1	51.2	0.92	(N>30)	0.39	N/A									
	25	36	SP	0	118	0.343	2.124	1.781	40	17	1.00	0.76	16.6	16.6	0.88	0.18	0.40		**0.44**						1.7	3.25	0.7
	25	41	SP	0	122	0.499	2.501	2.002	45	31	1.00	0.71	28.3	28.3	0.84	0.38	0.40		**0.94**						0.8	5	0.5
	25	46	SP	0	115	0.655	2.645	1.990	50	10	1.00	0.71	9.1	9.1	0.80	0.11	0.41		**0.26**						2.7	5	1.6
	25	50	SP	0	127	0.780	3.175	2.395	55	50	1.00	0.64	40.7	40.7	0.77	(N>30)	0.39	N/A									

SETTLEMENT OF FOOTINGS								
Project:	AF Property							
B:	5	feet (width or diameter)			b =	2.5	ft (1/2 width/dia)	
L:	5	feet (length)			l =	2.5	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	50
unit weight:	115.71	pcf (above footing depth)					Strip Load,k:	5
allowable q:	2000	psf						
footing type:	2	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	25	feet						
DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
CL	0.146	0.027	2100		115.71	0.6	1.0	3.51
GM	0.001	0.000125			120		6.0	1.00
ML	0.067	0.008	1500		120	0.5	21.0	0.70
	SQUARE/RECTANGULAR FOOTINGS (Boussinesq Method)...							
	Below ftg.		Increased	avg. ovrbn.	Incremnt.	Collapse	Total	
Soil Type	depth (ft)	Influence	Stress (psf)	press.(psf)	Sett. (in.)	Sett. (in.)	Set. (in.)	
Fill	0	0.000	0.0	462.8	0.000	0.000	0.00	
CL	1	0.960	1920.8	578.6	0.314	0.072	0.39	
GM	2	0.800	1599.4	698.6	0.006	0.000	0.39	
GM	3	0.606	1212.9	818.6	0.005	0.000	0.40	
GM	4	0.449	898.5	938.6	0.003	0.000	0.40	
GM	5	0.336	672.2	1058.6	0.003	0.000	0.40	
GM	6	0.257	513.6	1178.6	0.002	0.000	0.40	
ML	7	0.201	401.5	1298.6	0.050	0.060	0.51	
ML	8	0.160	320.6	1418.6	0.071	0.060	0.65	
ML	9	0.131	261.1	1538.6	0.055	0.060	0.76	
ML	10	0.108	216.2	1658.6	0.043	0.060	0.86	<---2B
ML	11	0.091	181.6	1778.6	0.034	0.060	0.96	<---2B
ML	12	0.077	154.6	1898.6	0.027	0.060	1.04	
ML	13	0.067	133.1	2018.6	0.022	0.060	1.13	
ML	14	0.058	115.6	2138.6	0.018	0.060	1.21	
ML	15	0.051	101.4	2258.6	0.015	0.060	1.28	
ML	16	0.045	89.6	2378.6	0.013	0.060	1.35	
ML	17	0.040	79.7	2498.6	0.011	0.060	1.42	
ML	18	0.036	71.4	2618.6	0.009	0.060	1.49	
ML	19	0.032	64.3	2738.6	0.008	0.060	1.56	
ML	20	0.029	58.2	2858.6	0.007	0.060	1.63	
ML	21	0.026	52.9	2978.6	0.006	0.060	1.69	

SETTLEMENT OF FOOTINGS								
Project:	AF Property							
B:	6.32456	feet (width or diameter)			b =	3.162278	ft (1/2 width/dia)	
L:	6.32456	feet (length)			l =	3.162278	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	80
unit weight:	115.71	pcf (above footing depth)					Strip Load,k:	5
allowable q:	2000	psf						
footing type:	3	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	25	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		3.5	1.00
CL	0.146	0.027	2100		115.71	0.6	3.5	2.07
GM	0.001	0.000125			120		6.0	1.00
ML	0.067	0.008	1500		120	0.5	21.0	0.68

	SQUARE/RECTANGULAR FOOTINGS (Westergard Method)...							
	Below ftg.		Increased	avg. ovrbn.	Incremnt.	Collapse	Total	
Soil Type	depth (ft)	Influence	Stress (psf)	press.(psf)	Sett. (in.)	Sett. (in.)	Set. (in.)	
Fill	1	0.838	1675.7	597.8	0.007	0.000	0.01	
Fill	2	0.688	1376.2	732.8	0.006	0.000	0.01	
Fill	3	0.559	1117.4	867.8	0.004	0.000	0.02	
Fill	3.5	0.503	1005.3	935.3	0.002	0.000	0.02	
CL	3.5	0.000	0.0	935.3	0.000	0.000	0.02	
GM	4.5	0.407	814.6	1055.3	0.003	0.000	0.02	
GM	5.5	0.332	663.6	1175.3	0.002	0.000	0.02	
GM	6	0.300	600.8	1235.3	0.001	0.000	0.03	
ML	7	0.248	496.0	1355.3	0.078	0.060	0.16	
ML	8	0.207	413.6	1475.3	0.086	0.060	0.31	
ML	9	0.174	348.5	1595.3	0.069	0.060	0.44	
ML	10	0.148	296.5	1715.3	0.056	0.060	0.55	
ML	11	0.127	254.7	1835.3	0.045	0.060	0.66	
ML	12	0.110	220.6	1955.3	0.037	0.060	0.76	
ML	13	0.096	192.7	2075.3	0.031	0.060	0.85	<---2B
ML	14	0.085	169.5	2195.3	0.026	0.060	0.93	
ML	15	0.075	150.1	2315.3	0.022	0.060	1.02	
ML	16	0.067	133.8	2435.3	0.019	0.060	1.09	
ML	17	0.060	119.9	2555.3	0.016	0.060	1.17	
ML	18	0.054	108.0	2675.3	0.014	0.060	1.24	
ML	19	0.049	97.8	2795.3	0.012	0.060	1.32	
ML	20	0.044	88.9	2915.3	0.010	0.060	1.39	
ML	21	0.041	81.2	3035.3	0.009	0.060	1.46	

Settlement--Footings 3

SETTLEMENT OF FOOTINGS								
Project:	AF Property							
B:	5	feet (width or diameter)			b =	2.5	ft (1/2 width/dia)	
L:	5	feet (length)			l =	2.5	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	50
unit weight:	115.71	pcf (above footing depth)					Strip Load,k:	5
allowable q:	2000	psf						
footing type:	2	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	25	feet						
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DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
CL	0.146	0.027	2100		115.71	0.6	1.0	3.51
GM	0.001	0.000125			120		6.0	1.00
ML	0.067	0.008	1500		120	0.5	21.0	0.70
	SQUARE/RECTANGULAR FOOTINGS (Boussinesq Method)...							
	Below ftg.		Increased	avg. ovrbn.	Incremnt.	Collapse	Total	
Soil Type	depth (ft)	Influence	Stress (psf)	press.(psf)	Sett. (in.)	Sett. (in.)	Set. (in.)	
Fill	0	0.000	0.0	462.8	0.000	0.000	0.00	
CL	1	0.960	1920.8	578.6	0.314	0.072	0.39	
GM	2	0.800	1599.4	698.6	0.006	0.000	0.39	
GM	3	0.606	1212.9	818.6	0.005	0.000	0.40	
GM	4	0.449	898.5	938.6	0.003	0.000	0.40	
GM	5	0.336	672.2	1058.6	0.003	0.000	0.40	
GM	6	0.257	513.6	1178.6	0.002	0.000	0.40	
ML	7	0.201	401.5	1298.6	0.050	0.060	0.51	
ML	8	0.160	320.6	1418.6	0.071	0.060	0.65	
ML	9	0.131	261.1	1538.6	0.055	0.060	0.76	
ML	10	0.108	216.2	1658.6	0.043	0.060	0.86	<---2B
ML	11	0.091	181.6	1778.6	0.034	0.060	0.96	<---2B
ML	12	0.077	154.6	1898.6	0.027	0.060	1.04	
ML	13	0.067	133.1	2018.6	0.022	0.060	1.13	
ML	14	0.058	115.6	2138.6	0.018	0.060	1.21	
ML	15	0.051	101.4	2258.6	0.015	0.060	1.28	
ML	16	0.045	89.6	2378.6	0.013	0.060	1.35	
ML	17	0.040	79.7	2498.6	0.011	0.060	1.42	
ML	18	0.036	71.4	2618.6	0.009	0.060	1.49	
ML	19	0.032	64.3	2738.6	0.008	0.060	1.56	
ML	20	0.029	58.2	2858.6	0.007	0.060	1.63	
ML	21	0.026	52.9	2978.6	0.006	0.060	1.69	

SETTLEMENT OF FOOTINGS								
Project:	AF Property							
B:	6.32456	feet (width or diameter)			b =	3.162278	ft (1/2 width/dia)	
L:	6.32456	feet (length)			l =	3.162278	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	80
unit weight:	115.71	pcf (above footing depth)					Strip Load,k:	5
allowable q:	2000	psf						
footing type:	3	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	25	feet						
DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		3.5	1.00
CL	0.146	0.027	2100		115.71	0.6	3.5	2.07
GM	0.001	0.000125			120		6.0	1.00
ML	0.067	0.008	1500		120	0.5	21.0	0.68
	SQUARE/RECTANGULAR FOOTINGS (Westergard Method)...							
	Below ftg.		Increased	avg. ovrbn.	Incremnt.	Collapse	Total	
Soil Type	depth (ft)	Influence	Stress (psf)	press.(psf)	Sett. (in.)	Sett. (in.)	Set. (in.)	
Fill	1	0.838	1675.7	597.8	0.007	0.000	0.01	
Fill	2	0.688	1376.2	732.8	0.006	0.000	0.01	
Fill	3	0.559	1117.4	867.8	0.004	0.000	0.02	
Fill	3.5	0.503	1005.3	935.3	0.002	0.000	0.02	
CL	3.5	0.000	0.0	935.3	0.000	0.000	0.02	
GM	4.5	0.407	814.6	1055.3	0.003	0.000	0.02	
GM	5.5	0.332	663.6	1175.3	0.002	0.000	0.02	
GM	6	0.300	600.8	1235.3	0.001	0.000	0.03	
ML	7	0.248	496.0	1355.3	0.078	0.060	0.16	
ML	8	0.207	413.6	1475.3	0.086	0.060	0.31	
ML	9	0.174	348.5	1595.3	0.069	0.060	0.44	
ML	10	0.148	296.5	1715.3	0.056	0.060	0.55	
ML	11	0.127	254.7	1835.3	0.045	0.060	0.66	
ML	12	0.110	220.6	1955.3	0.037	0.060	0.76	
ML	13	0.096	192.7	2075.3	0.031	0.060	0.85	<---2B
ML	14	0.085	169.5	2195.3	0.026	0.060	0.93	
ML	15	0.075	150.1	2315.3	0.022	0.060	1.02	
ML	16	0.067	133.8	2435.3	0.019	0.060	1.09	
ML	17	0.060	119.9	2555.3	0.016	0.060	1.17	
ML	18	0.054	108.0	2675.3	0.014	0.060	1.24	
ML	19	0.049	97.8	2795.3	0.012	0.060	1.32	
ML	20	0.044	88.9	2915.3	0.010	0.060	1.39	
ML	21	0.041	81.2	3035.3	0.009	0.060	1.46	

Settlement--Footings 3

SETTLEMENT OF FOOTINGS								
Project:	AF Property							
B:	2.5	feet (width or diameter)			b =	1.25	ft (1/2 width/dia)	
L:	25	feet (length)			l =	12.5	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	50
unit weight:	115.71	pcf (above footing depth)					Strip Load,k:	5
allowable q:	2000	psf						
footing type:	1	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	25	feet						

DEFINE SOIL PROFILE:

Soil type	C_c'	C_r'	preconsol press., σ_c'(psf)	OCR	Density (pcf)	Collapse (%)	Below ftg. depth (ft)	Avg. OCR
Fill	0.001	0.000125			135		0.0	1.00
CL	0.146	0.027	2100		115.71	0.6	1.0	3.51
GM	0.001	0.000125			120		6.0	1.00
ML	0.067	0.008	1500		120	0.5	21.0	0.70

STRIP FOOTINGS...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	462.8	0.000	0.000	0.00	
CL	1	0.881	1762.0	578.6	0.264	0.072	0.34	
GM	2	0.642	1283.5	698.6	0.005	0.000	0.34	
GM	3	0.477	954.7	818.6	0.004	0.000	0.35	
GM	4	0.374	748.1	938.6	0.003	0.000	0.35	
GM	5	0.306	611.5	1058.6	0.002	0.000	0.35	<---2B
GM	6	0.258	515.7	1178.6	0.002	0.000	0.35	<---2B
ML	7	0.223	445.3	1298.6	0.059	0.060	0.47	
ML	8	0.196	391.6	1418.6	0.085	0.060	0.62	
ML	9	0.175	349.2	1538.6	0.071	0.060	0.75	
ML	10	0.158	315.0	1658.6	0.061	0.060	0.87	
ML	11	0.143	286.9	1778.6	0.052	0.060	0.98	
ML	12	0.132	263.4	1898.6	0.045	0.060	1.09	
ML	13	0.122	243.4	2018.6	0.040	0.060	1.19	
ML	14	0.113	226.2	2138.6	0.035	0.060	1.28	
ML	15	0.106	211.2	2258.6	0.031	0.060	1.37	
ML	16	0.099	198.1	2378.6	0.028	0.060	1.46	
ML	17	0.093	186.6	2498.6	0.025	0.060	1.55	
ML	18	0.088	176.3	2618.6	0.023	0.060	1.63	
ML	19	0.084	167.0	2738.6	0.021	0.060	1.71	
ML	20	0.079	158.7	2858.6	0.019	0.060	1.79	
ML	21	0.076	151.2	2978.6	0.017	0.060	1.86	

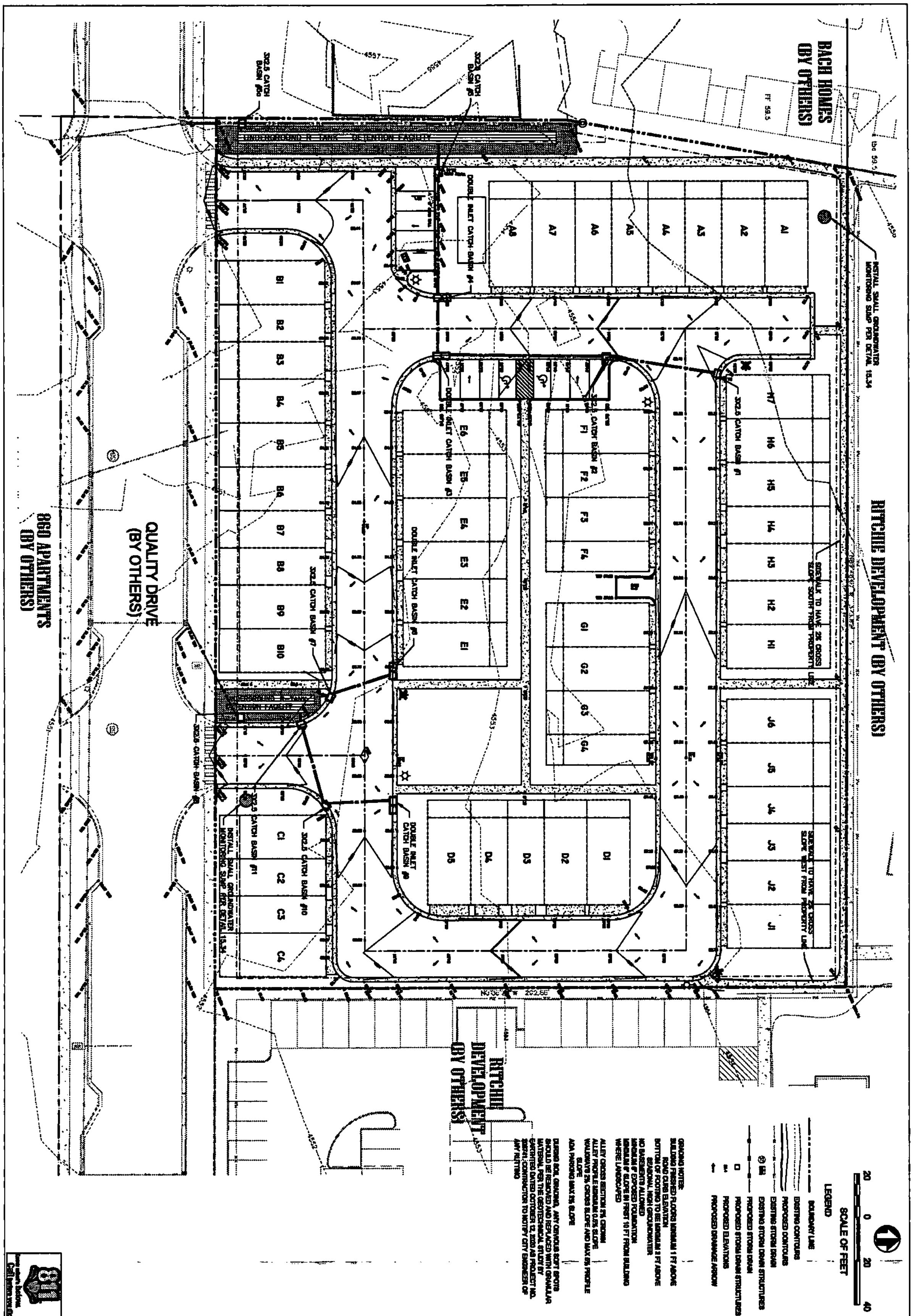

Exhibit C'

WALTON TOWN HOMES

GRADING PLAN

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